

## PATENT ABSTRACTS OF JAPAN

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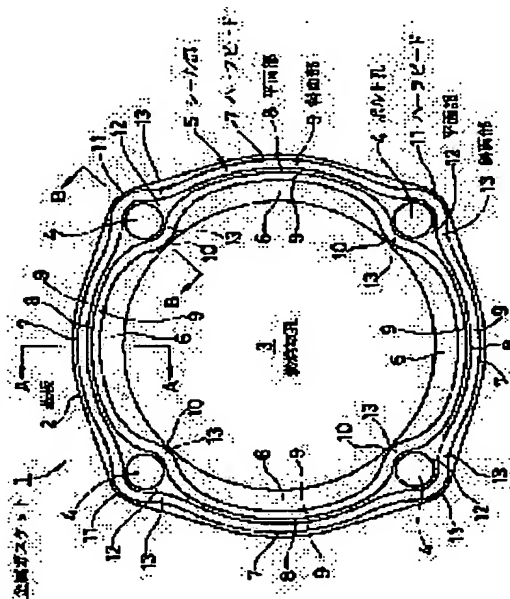
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## (54) METAL GASKET

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a gasket, having capability of being compressed sufficiently throughout the entire length of a bead shaped seal portion, even when a fastening force acting on the gasket is small or the rigidity of housings for catching the gasket in between is low, and demonstrate superior sealing property.

**SOLUTION:** A metal gasket 1, having a base plate 2 made of an elastic metal plate, is provided with a combustion chamber hole 3, a plurality of bolt holes 4, and a bead shaped sealing portion 5 around the combustion chamber hole 3. The base plate 2 is provided with half beads 7, 11 with which flat portions 8, 12 are integrally formed via slanted portions 9, 13 at different heights, with respect to the base plate 2 over the entire length of the sealing portion 5, including portions 6 between the bolt holes. The bolt holes 4 are arranged within faces of flat surface portions 12 of the half beads 11.



## LEGAL STATUS

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**CLAIMS**

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**[Claim(s)]**

[Claim 1] In the metallic gasket (1) which prepared the bead-like seal section (5) in the perimeter of said combustion chamber hole (3) while preparing a combustion chamber hole (3) and two or more boltholes (4) in the substrate (2) which consists of an elastic metal plate While continuing and preparing the half bead (7) which really fabricated the flat-surface section (8) of a different height location to said substrate (2), and (12) to said substrate (2) through a slant surface part (9) and (13), and (11) in the overall length of said seal section (5) containing a part for bolthole Mabe, said seal section (5), (6) The metallic gasket characterized by having arranged said bolthole (4) in the field of the flat-surface section (12) of said half bead (11).

[Claim 2] In the metallic gasket of claim 1, while forming small the width of face (W1) of the slant surface part (9) in a part for bolthole Mabe (6) from the width of face (W2) of the slant surface part (13) in the bolthole circumference part (10) of the seal section (5) The metallic gasket characterized by forming greatly the height (H1) of the slant surface part (9) in a part for said bolthole Mabe (6) from the height (H2) of the slant surface part (13) in said bolthole circumference part (10).

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the gasket which is a kind of a sealing device, especially relates to a metal gasket.

[0002]

[Description of the Prior Art] The metallic gasket 51 shown in drawing 3 and drawing 4 is known, and it consists of the former as follows (refer to JP,63-193159,U).

[0003] That is, first, as shown in drawing 3, it has the substrate 52 which consists of an elastic metal plate, and the combustion chamber hole 53 and the bolthole 54 of plurality (drawing six places) are formed in this substrate 52, and the bead-like seal section 55 covers the perimeter and is further prepared in the perimeter of the combustion chamber hole 53.

[0004] As shown in drawing 4 (A), while the seal section 55 of the shape of this bead is formed as a full bead 56 in the part between a bolthole 54 and a bolthole 54 (a part for bolthole Mabe) As shown in drawing 4 (B), in the circumference part (bolthole circumference part) of a bolthole 54, it is formed as a half bead 58, and is formed by putting this full bead 56 and the half bead 58 together. The thing and the latter half bead 58 which the former full bead 56 really fabricated the bulge section 57 of a cross-section radii form to the substrate 52, and made the both sides of this bulge section 57 the same height location mutually The flat-surface section 59 of a different height location to a substrate 52 is really fabricated to a substrate 52 through a slant surface part 60, and the bolthole 54 is arranged in the field of the flat-surface section 59 of the half bead 58 of this latter.

[0005] However, it sets to the above-mentioned conventional metallic gasket 51. Since the full bead 56 equipped with the property which is comparatively hard to compress into a part of seal section 55, considering the structure is formed as described above When the rigidity of housing which puts the case where the bolting force of acting on the gasket 51 concerned is small, and the gasket 51 concerned is low, this full bead 56 cannot fully be compressed, but there is a possibility that leakage may occur without therefore fully demonstrating the seal engine performance.

[0006]

[Problem(s) to be Solved by the Invention] When the rigidity of housing which puts the case where the bolting force of this invention of act on a gasket in view of the above point is small, and a gasket is low, it aims at offer the gasket which can demonstrate the seal engine performance which could cover the overall length, could fully compress the bead-like seal section, had it, and was excellent.

[0007] moreover — in addition, even if deformation of a wave etc. occurs in the pinching side of housing which puts a gasket, it aims at offering the gasket which can demonstrate the seal nature which the seal section could fully follow in footsteps to this deformation, had, and was excellent also from this point.

[0008]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the gasket by claim 1 of this invention In the metallic gasket which prepared the bead-like seal section in the

perimeter of said combustion chamber hole while preparing a combustion chamber hole and two or more boltholes in the substrate which consists of an elastic metal plate While continuing and preparing the half bead which really fabricated the flat-surface section of a different height location to said substrate to said substrate through the slant surface part in the overall length of said seal section containing a part for bolthole Mabe, said seal section It is characterized by having arranged said bolthole in the field of the flat-surface section of said half bead.

[0009] Moreover, in the above-mentioned metallic gasket of claim 1, the metallic gasket by claim 2 of this invention is characterized by forming greatly the height of the slant surface part in a part for said bolthole Mabe from the height of the slant surface part in said bolthole circumference part while it forms small the width of face of the slant surface part in a part for bolthole Mabe from the width of face of the slant surface part in the bolthole circumference part of the seal section.

[0010] In the metallic gasket by claim 1 of this invention equipped with the above-mentioned configuration Since the half bead equipped with the property which is easy to compress as compared with a full bead is continued and prepared in the overall length of not only a bolthole circumference part but the seal section containing a part for bolthole Mabe When the rigidity of housing which puts the case where the bolting force of acting on the gasket concerned is small, and the gasket concerned is low, it becomes possible to fully compress the whole bead-like seal section. As described above, a half bead really fabricates to a substrate the flat-surface section of a different height location to the substrate which consists of an elastic metal plate through a slant surface part at a cantilever type, and has the description with which compressibility can demonstrate seal nature by the low load highly.

[0011] In the metallic gasket by claim 2 of this invention which was equipped with the above-mentioned configuration again in addition to this While the width of face of the slant surface part in a part for bolthole Mabe is small formed from the width of face of the slant surface part in the bolthole circumference part of the seal section Since the height of the slant surface part in a part for bolthole Mabe is greatly formed from the height of the slant surface part in a bolthole circumference part, the half bead in a part for bolthole Mabe is stronger, and repulsive force excels the half bead in a bolthole circumference part in the imitation nature to partner material. Therefore, even if deformation of a wave etc. occurs in the conclusion side of housing which puts a gasket, it enables the seal section to fully follow in footsteps to this deformation in a part for bolthole Mabe.

[0012]

[Embodiment of the Invention] The operation gestalt of this invention is explained according to a drawing below.

[0013] While drawing 1 shows the flat surface of the gasket 1 concerning the operation gestalt concerned and the A-A line enlarged section is shown in drawing 2 (A), the B-B line enlarged section is shown in drawing 2 (B).

[0014] As shown in drawing 1, the metallic gasket 1 concerning the operation gestalt concerned is first equipped with the plate-like substrate 2 which consists of an elastic metal plate, and the bead-like seal section 5 covers the perimeter around the combustion chamber hole 3, and it is formed in endless while the combustion chamber hole 3 and the bolthole 4 of plurality (drawing four places) are formed in this substrate 2 that had the predetermined flat-surface layout set up, respectively.

[0015] The seal section 5 of the shape of this bead is set into the part 6 between a bolthole 4 and a bolthole 4 (a part for bolthole Mabe), as shown in drawing 2 (A). While being formed as a half bead 7 which really fabricated the flat-surface section 8 of a different height location to a substrate 2 to the substrate 2 through the slant surface part 9 As shown in drawing 2 (B), it also sets into the circumference part (bolthole circumference part) 10 of a bolthole 4. Similarly It is formed as a half bead 11 which really fabricated the flat-surface section 12 of a different height location to a substrate 2 to the substrate 2 through the slant surface part 13, namely, the seal section 5 covers the overall length, and is formed only of the half beads 7 and 11.

[0016] In this half bead 7 and 11 structures, the flat-surface section 8 in a part for bolthole Mabe 6 and the flat-surface section 12 in the bolthole circumference part 10 are connected with

a single string, and are making the endless field. However, the bolthole 4 to form greatly the direction of the flat-surface section 12 in the bolthole circumference part 10, and keep putting a conclusion bolt (not shown) in the field of the flat-surface section 12 in the bolthole circumference part 10 of this latter from the flat-surface section [ in / in that width of face / a part for bolthole Mabe 6 ] 8, is arranged, respectively. moreover, the height location from there being a difference in the height H2 of the slant surface part 13 in the bolthole circumference part 10, and the height H1 of the slant surface part 9 in a part for bolthole Mabe 6 so that a postscript may be carried out In connection with this, it differs mutually, and from the flat-surface section 12 in the bolthole circumference part 10, the direction of the flat-surface section 8 in a part for bolthole Mabe 6 is located in a high location, and, specifically, the smooth level difference (not shown) is formed in both boundary part.

[0017] Moreover, the slant surface part 9 in a part for bolthole Mabe 6 and the slant surface part 13 in the bolthole circumference part 10 are connected with a single string, and the endless field is made. The width of face W1 of the slant surface part 9 in a part for bolthole Mabe 6 is small formed from the width of face W2 of the slant surface part [ in / in the width of face / the bolthole circumference part 10 ] 13. However, moreover, the height The height H1 of the slant surface part 9 in a part for bolthole Mabe 6 is greatly formed from the height H2 of the slant surface part 13 in the bolthole circumference part 10. Repulsive force is strongly set up by these for the half bead 7 in a part for bolthole Mabe 6 from the half bead 11 in the bolthole circumference part 10.

[0018] The gasket 1 equipped with the above-mentioned configuration is infixed between an internal combustion engine's cylinder head and a cylinder block as a cylinder head gasket, the seal of between both members is carried out, and it has the description at the point which does the following operation effectiveness so by the above-mentioned configuration.

[0019] That is, first, the full bead equipped with the property which is comparatively hard to compress in the gasket 1 equipped with the above-mentioned configuration is not prepared at all, but the seal section 5 covers the overall length, and it is formed only of the half beads 7 and 11 equipped with the property which is easy to compress as compared with a full bead.

Therefore, when the rigidity of housing which puts the case where the bolting force of acting on the gasket 1 concerned is small, and the gasket 1 concerned is low, the whole bead-like seal section can fully be compressed, and the seal engine performance which was excellent by this can be demonstrated.

[0020] In addition to this, it sets to the gasket 1 of the above-mentioned configuration again. While the width of face W1 of the slant surface part 9 in a part for bolthole Mabe 6 is small formed from the width of face W2 of the slant surface part 13 in the bolthole circumference part 10 of the seal section 5 Since the height H1 of the slant surface part 9 in a part for bolthole Mabe 6 is greatly formed from the height H2 of the slant surface part 13 in the bolthole circumference part 10 The half bead 7 in a part for bolthole Mabe 6 is stronger, and, therefore, repulsive force excels the half bead 11 in the bolthole circumference part 10 in the imitation nature to partner material, such as housing. Therefore, even if deformation of a wave etc. occurs in the conclusion side of housing which puts the gasket 1 concerned, in a part for bolthole Mabe 6, the seal section 5 can fully follow in footsteps to this deformation, and can demonstrate the seal engine performance which was therefore excellent also from this point. In especially low rigidity housing, since it is easy to generate a wave after the first stage or conclusion, if the gasket 1 concerned is used, it is effective.

[0021]

[Effect of the Invention] This invention does the following effectiveness so.

[0022] Namely, it sets first to the metallic gasket by claim 1 of this invention equipped with the above-mentioned configuration. While the half bead which really fabricated the flat-surface section of a different height location to a substrate to the substrate through the slant surface part is continued and prepared in the overall length of the seal section containing a part for bolthole Mabe, the seal section Since the bolthole is arranged in the field of the flat-surface section of this half bead When the rigidity of housing which puts the case where the bolting force of acting on the gasket concerned is small, and the gasket concerned is low, the whole bead-like

seal section can fully be compressed, and the seal engine performance which was excellent by this can be demonstrated.

[0023] In the metallic gasket by claim 2 of this invention which was equipped with the above-mentioned configuration again in addition to this While the width of face of the slant surface part in a part for bolthole Mabe is small formed from the width of face of the slant surface part in the bolthole circumference part of the seal section Since the height of the slant surface part in a part for bolthole Mabe is greatly formed from the height of the slant surface part in a bolthole circumference part The half bead in a part for bolthole Mabe is stronger, and, therefore, repulsive force excels the half bead in a bolthole circumference part in the imitation nature to partner material, such as housing. Therefore, even if deformation of a wave etc. occurs in the conclusion side of housing which puts the gasket concerned, in a part for bolthole Mabe, the seal section can fully follow in footsteps to this deformation, and can demonstrate the seal engine performance which was therefore excellent also from this point.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] The top view of the metallic gasket concerning the operation gestalt of this invention

[Drawing 2] For (A), (B) is an A-A line expanded sectional view in drawing 1 , and a B-B line expanded sectional view [ in / similarly / drawing 1 ].

[Drawing 3] The top view of the metallic gasket concerning the conventional example

[Drawing 4] For (A), (B) is a C-C line expanded sectional view in drawing 3 , and D-D line expanded sectional view [ in / similarly / drawing 3 ].

[Description of Notations]

1 Metallic Gasket

2 Substrate

3 Combustion Chamber Hole

4 Bolthole

5 Seal Section

6 A Part for Bolthole Mabe

7 11 Half bead

8 12 Flat-surface section

9 13 Slant surface part

10 Bolthole Circumference Part

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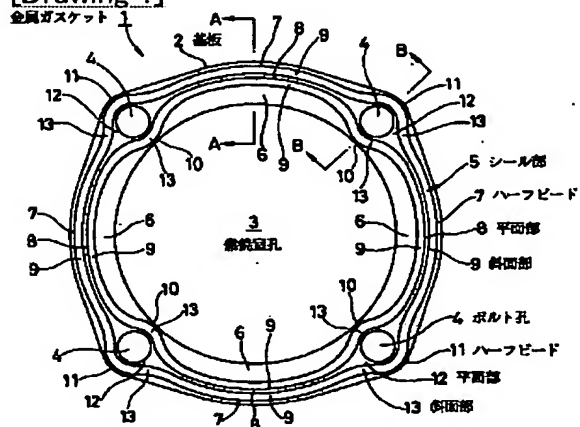
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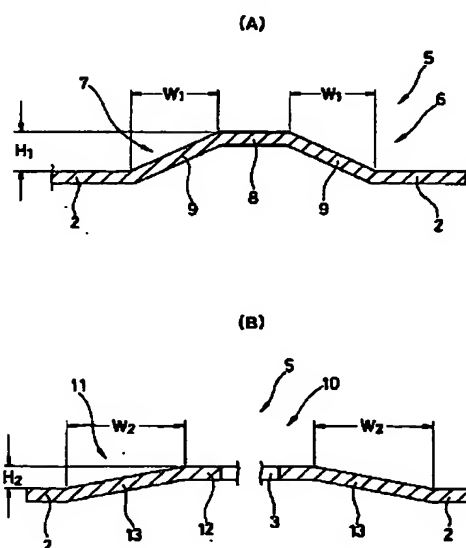
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## DRAWINGS

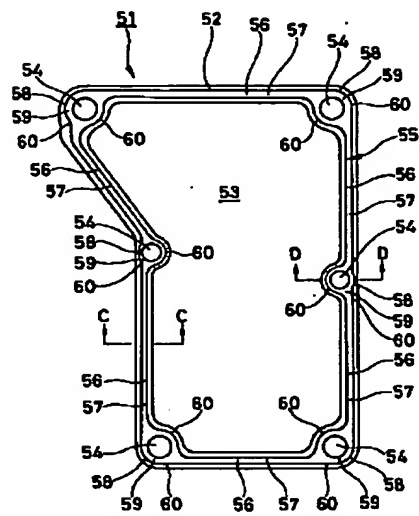
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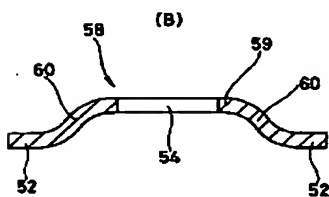
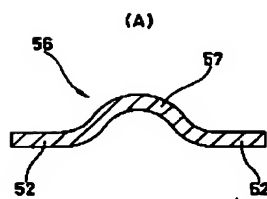
[Drawing 2]



[Drawing 3]



[Drawing 4]



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